

*Scapania undulata* (L.) Dumort. Borders of Lower Basin Pond; on logs in Great Basin; dry brook near brow of Tableland.

\* *Frullania Oakesiana* Aust. On balsam fir, South Basin. Rather common.

HULL BOTANICAL LABORATORY, University of Chicago.

EXPLANATION OF PLATE 44.—Fig. 1 (upper): Shelf at base of the North West Spur of Ktaadn, showing Lake Cowles and the larger of the *roches moutonnées* to the right; Sourdnehunk Range to the west.

Fig. 2 (lower): Heath society on the larger of the *roches moutonnées*, showing the encroachment of spruce; Sourdnehunk Range to the west.

## RECENTLY RECOGNIZED SPECIES OF CRATAEGUS IN EASTERN CANADA AND NEW ENGLAND, — I.

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SINCE the publication in RHODORA in February and April, 1901, of several species of *Crataegus* found in the Champlain valley by Mr. Ezra Brainerd and other Vermont botanists, and in the neighborhood of Montreal by Mr. J. G. Jack, numerous collections of these plants have been made in Canada and New England. These disclose new forms which have previously remained unrecognized. Some of these are described in the following papers, while others cannot be properly characterized until they have been more fully studied in the field.

### § CRUS-GALLI.

***Crataegus exigua*, n. sp.** Glabrous with the exception of a few hairs along the upper side of the midribs of young leaves. Leaves mostly erect, oblong-obovate and rounded or acute at the apex, cuneate and entire below the middle, above and often only toward the apex finely serrate, with straight or incurved teeth; bright red when they unfold and nearly fully grown when the flowers open, at maturity subcoriaceous, dark green and lustrous on the upper surface, paler and dull green on the lower surface, 3.5–5 cm. long, 1.5–2.5 cm. wide, with broad midribs raised and rounded on the upper side and



four or five pairs of thin primary veins almost entirely within the parenchyma; leaves of vigorous shoots oval, acute or acuminate, coarsely glandular-serrate, with prominent primary veins, stout petioles often red in the autumn, their stipules falcate, acuminate, coarsely glandular-serrate, 1-1.2 cm. long; petioles wing-margined nearly to the base, 8-12 mm. long. Flowers 1.5-1.7 cm. in diameter on slender pedicels, in broad 17-22-flowered thin-branched compound corymbs; bracts and bractlets minute, linear, red, caducous; calyx-tube narrowly obconic, the lobes elongated, narrow, acuminate, often red at the tips, entire or sparingly glandular, with minute red glands, reflexed after anthesis; stamens 8-10, usually 10; anthers deep rose-purple; styles 1 or very rarely 2. Fruit erect on thin rigid pedicels, in broad many-fruited clusters, oblong, full and rounded at the ends, bright crimson marked by numerous dark red dots, 10-11 mm. long, 9-10 mm. wide; calyx broad with a shallow cavity and spreading closely appressed lobes; flesh thin, yellow, dry and mealy; nutlet 1, narrowed from the middle to the obtuse ends, prominently ridged on the dorsal face, with a high rounded ridge, 8-10 mm. long, or rarely 2 and then smaller and compressed on the inner face.

A broad round-topped shrub 2-3 m. in height with numerous stout stems covered with smooth pale gray bark, and slender slightly zig-zag branchlets marked by small oblong pale lenticels, dark olive green tinged with red when they first appear, dull reddish brown or orange-brown during their first season, becoming pale gray-brown the following year and armed with many stout straight or slightly curved spines generally spreading at right angles, chestnut-brown and lustrous while young, finally becoming ashy gray, usually 4-5 cm. long. Flowers during the first week of June. Fruit ripens and falls during the first week of October.

CONNECTICUT: Waterford, on the ridge east of Fog Plain Brook, and pastures near Gilead, June and October 1902; East Haven, June 17, 1902; Shelden's Cove, Lyme, September 1902; Stonington, September 1902, *C. B. Graves*.

This shrubby species is well distinguished from *Crataegus Crus-galli*, Linnaeus, the only other species of this group which has been found in New England, by its usually solitary style and nutlet, its smaller more oblong brighter-colored fruit which falls as soon as ripe early in October, while the fruit of *Crataegus Crus-galli* remains on the branches usually until spring, and by its shrubby habit.



## § PRUINOSAE.

\* Stamens 20.

+ Anthers rose color or lilac.

CRATAEGUS PRUINOSA, K. Koch. Sargent, *Silva N. Am.* xiii. 61, t. 48.

Colonies of this widely distributed species differing from the type only in rather longer calyx-lobes and in smaller duller colored fruit were found last year in North Lancaster and Shirley, Massachusetts, by *Mrs. John E. Thayer*.

**Crataegus festiva**, n. sp. Glabrous. Leaves broadly ovate, acute, full and rounded, concave-cuneate or rarely subcordate at the entire base, coarsely and mostly doubly serrate above, with straight teeth tipped with large red glands, often irregularly divided into short lateral lobes; tinged with red as they unfold, and about half-grown and light green when the flowers open, at maturity membranaceous, dark bluish green on the upper surface, pale yellow-green on the lower surface, 5-8 cm. long, 4-6 cm. wide, with stout light yellow midribs deeply impressed on the upper side and often tinged with red below near the base, and 4 or 5 pairs of thin obscure primary veins extending obliquely to the points of the lobes; petioles slender, sparingly glandular, 2-2.4 cm. long; stipules linear, glandular-serrate, caducous; on leading shoots leaves oblong-ovate, acute or acuminate, broadly concave-cuneate and narrowed below into stout wide-margined petioles, 3-lobed with broad acute lobes, the lateral lobes much smaller than the terminal lobe, sometimes 7-8 cm. long and broad, their stipules foliaceous, lunate, irregularly and coarsely glandular-serrate, 1.5-1.8 cm. long, persistent. Flowers 2.6-2.7 cm. in diameter when fully expanded, on slender pedicels, in broad many-flowered thin-branched compound corymbs; bracts and bractlets oblong-obovate to linear, acute, glandular-serrate, caducous; calyx-tube broadly obconic, the lobes abruptly narrowed from broad bases, acute, prominently nerved, slightly serrate above the middle, with small glandular teeth, or nearly entire, reflexed after anthesis; stamens 16-20; anthers large, deep rose color; styles 3-5. Fruit erect in few-fruited clusters, subglobose, dull red, pruinose, 10-11 mm. in diameter; calyx prominent, sessile, with a broad deep cavity, and enlarged acuminate often coarsely serrate spreading or erect lobes; flesh thin, dry and hard, insipid to the taste, greenish white; nutlets usually 3, acute at the ends, rounded and occasionally slightly ridged on the back, 6-7 mm. long.

A shrub 1-2 m. high, with numerous intricately branched stems covered with dark gray bark and rarely more than 5 cm. in diameter,



and slender zigzag branchlets green tinged with red when they first appear, dull purple and marked by oblong pale lenticels during their first season, becoming reddish brown the following year, and armed with numerous slender nearly straight lustrous chestnut-brown spines 4–5 cm. long. Flowers during last week of May. Fruit ripens from the first to the middle of October and falls slowly. Late in the autumn the leaves turn a dull purple color.

CONNECTICUT: Open rocky pastures near the shores of Niantic River, East Lyme and from one to two miles north of the village of Niantic, *C. B. Graves*, May and October 1902.

***Crataegus Pequotorum***, n. sp. Glabrous. Leaves ovate, acute or acuminate, rounded or broadly cuneate at the entire base, sharply and doubly glandular-serrate above, rarely divided into short acute lateral lobes; thin, often concave, dull light green above, paler below and nearly fully grown when the flowers open, at maturity membranaceous, dark blue-green on the upper surface, paler on the lower surface, 5–6 cm. long, 4–5 cm. wide, or on vigorous shoots 6.5–7 cm. long and broad, with slender midribs impressed on the upper side and 4 or 5 pairs of thin primary veins; petioles slender, slightly or on leading shoots broadly wing margined at the apex, 2–3 cm. long. Flowers 1.5 cm. in diameter, on slender elongated pedicels in simple or rarely compound 3–6, very rarely 9-flowered thin-branched corymbs; bracts and bractlets minute, oblong-obovate, glandular-serrate, caducous; calyx-tube broadly obconic, the lobes gradually narrowed from broad bases, short, acuminate, tipped with dark glands, entire or rarely obscurely serrate, reflexed after anthesis; petals occasionally deep rose color; stamens 18–20; anthers large, lilac color; styles 4 or 5, rarely 3. Fruit more or less pendant, short-obovate, full and rounded at the apex, abruptly narrowed below into the enlarged apex of the pedicel, obtusely 4 or 5-angled, 9–11 mm. long, 11–13 mm. wide, dark crimson, pruinose, marked by numerous large dark lenticels; calyx prominent, with a distinct tube, a broad shallow cavity and spreading and reflexed lobes; flesh thick, hard but somewhat juicy, insipid, crimson; nutlets 3–5, acute at the ends, thin, rounded and slightly grooved on the back, 7 mm. long.

An arborescent shrub 2–3 m. in height with a stem covered with rough gray bark, and usually 7–8 cm. in diameter, ascending and wide-spreading branches, and slender branchlets marked by small oblong pale lenticels, yellow-green tinged with red when they first appear, dull red-brown or purplish during their first season, becoming slightly darker the following year, and usually ashy gray during the following season, and armed with stout straight dark purple lustrous spines usually about 2.5 cm. long, and conspicuous globose winter-



buds 3-4 mm. in diameter, with lustrous bright chestnut-brown scales scarious on the margins. Flowers during the first week of June. Fruit ripens and begins to fall about October 20th.

CONNECTICUT: Mumford's Point, Groton, in the region once inhabited by the Pequot Indians, *C. B. Graves*, June and October 1902.

Well distinguished from the other described species of this group by the form of its thin leaves with their long petioles and by the crimson flesh of the pear-shaped fruit.

***Crataegus pilosa***, n. sp. Leaves ovate to rhombic, acute or acuminate, full and rounded, or cuneate or on leading shoots truncate or subcordate at the entire often glandular base, finely and usually doubly serrate above, with gland-tipped teeth and often, particularly on vigorous shoots, divided into short acute lobes; when they unfold tinged with red and coated above with long pale hairs; nearly fully grown when the flowers open and then thin, membranaceous, pale yellow-green and still slightly pilose; at maturity subcoriaceous, glabrous, dark blue-green on the upper surface, paler on the lower surface, 4-6 cm. long and broad, with slender midribs slightly impressed above and 3 or rarely 4 pairs of thin remote primary veins extending obliquely to the points of the lobes; petioles slender, wing-margined above, deeply grooved, glandular, with few large dark red glands, 1.2-1.4 cm. long; stipules linear to falcate, coarsely glandular-serrate, caducous. Flowers on slender elongated pedicels, in 3-5-flowered glabrous thin-branched compound corymbs; calyx-tube broadly obconic, the lobes short, acute, entire or occasionally furnished with a few small glandular teeth, reflexed after anthesis; stamens 20; anthers small, bright rose color; styles 5 or rarely 4, surrounded at the base by a narrow ring of pale hairs. Fruit erect, subglobose to broadly ovate, often somewhat angled below the middle, dull dark crimson, about 3 cm. long; calyx sessile, with a broad shallow cavity and much enlarged lobes gradually narrowed from broad bases, spreading or reflexed; flesh thin, dry and mealy, pale green; nutlets 4 or 5, thin, acute at the ends, conspicuously and irregularly ridged on the back" with a high rounded ridge, about 1.2 cm. long.

An intricately branched shrub 3-4 m. high, with numerous stout stems covered with rough ashy gray bark, and slender slightly zigzag branchlets marked by oblong scattered pale lenticels, yellow-green when they first appear, dull purple during their first season, chestnut-brown and lustrous when the flowers open the following spring, and finally pale gray tinged with red, and armed with numerous stout nearly straight shining chestnut-brown ultimately ashy gray spines



2–3 cm. long. Flowers about the 20th of May. Fruit ripens and falls the middle of October.

MASSACHUSETTS: Thickets, Lancaster, *Mrs. John E. Thayer*, May and October 1902.

Distinguished from all described species of the *Pruinosa* Group by the abundant hairs on the upper surface of the young leaves which in May make it difficult to distinguish it from some species of the *Tenuifolia* Group.

+ + Anthers yellow.

***Crataegus conjuncta***, n. sp. Glabrous. Leaves ovate to oval, acute or acuminate, rounded or cuneate, or on leading shoots truncate at the mostly entire base, sharply usually doubly glandular-serrate above, more or less deeply divided into 3 or 4 pairs of acute or acuminate lateral lobes; bronze color when they unfold, and when the flowers open thick and firm, light yellow and more than half grown; at maturity coriaceous, dark blue-green and lustrous on the upper surface, pale on the lower surface, about 5 cm. long, 3.5–6 cm. wide, with thin yellow midribs impressed above and remote slender straight or arching veins extending to the points of the lobes; petioles slender, usually slightly wing-margined above, sparingly and irregularly glandular on the margins, 2–2.5 cm. long; stipules lanceolate to oblong-obovate, glandular-serrate, caducous. Flowers 1.6–1.8 cm. in diameter on slender pedicels, in 5–10, usually 5 or 6-flowered compound thin-branched corymbs; bracts and bractlets linear and acuminate to lanceolate, glandular, pink, caducous; calyx-tube broadly obconic, the lobes gradually narrowed from broad bases, nearly triangular, tipped with bright red glands, entire or coarsely and irregularly glandular-serrate; stamens 20; anthers small, light yellow; styles 3–5, usually 5. Fruit drooping or erect in few-fruited clusters, subglobose, usually broader than long, angled sharply while young, full and rounded at the ends, about 1 cm. in diameter, when fully grown dull green covered with a thick glaucous bloom, at maturity dull orange-red more or less blotched with green and marked by many small dark dots; calyx enlarged, prominent with a well developed tube, a broad deep cavity, and spreading or incurved often slightly serrate lobes dark red on the upper side below the middle; flesh green, thin, hard and dry; nutlets 4 or 5, thick, acute at the ends, ridged on the back, with a high rounded often grooved ridge, 7–8 mm. long.

A broad round-topped intricately branched shrub 3 or 4 m. in height, occasionally arborescent in habit, with one or more stems 5–6 cm. in diameter, light gray scaly bark and slender straight or slightly zigzag



branchlets, light yellow-green when they first appear, becoming bright chestnut or orange-brown and marked by numerous small oblong pale lenticels during their first season, and ashy gray or pale gray-brown the following year, and armed with many stout nearly straight lustrous chestnut-brown ultimately gray spines 2.5–5 cm. long and often pointed toward the base of the branch. Flowers late in May or during the first week of June. Fruit ripens early in October and falls gradually.

MASSACHUSETTS: Somerset, *Miss L. H. Handy*, 1900; Topsfield, *T. E. Proctor*, October 1900, June 1901; upland pastures, Boylston and Lancaster, *J. G. Jack*, *Mrs. J. E. Thayer*, and *C. S. Sargent*, 1899 to 1902. CONNECTICUT: Oxford, *E. B. Harger*, May and September 1900 and 1901.

***Crataegus cognata***, n. sp. Glabrous. Leaves ovate, acute or acuminate, rounded or broadly concave-cuneate at the entire base, sharply and often doubly glandular-serrate above and divided into 3 or 4 pairs of short acute lateral lobes; nearly fully grown when the flowers open and then thin, dark blue-green on the upper surface, pale on the lower surface; at maturity coriaceous, dull blue-green above, pale yellow-green below, 6–6.7 cm. long, 3.5–5.5 cm. wide, with thin yellow midribs deeply impressed above and slender primary veins extending to the points of the lobes; petioles slender, slightly winged at the apex, grooved, glandular, with small dark glands, 2–3 cm. long; stipules linear, acuminate, glandular-serrate, caducous; on vigorous shoots leaves often oblong-ovate, acuminate, subcordate at the base, coarsely serrate, deeply 3-lobed, the lateral lobes acute and much smaller than the terminal lobe, 8–9 cm. long, 7–7.5 cm. wide, their petioles stout, 2–3 cm. long, broadly wing-margined nearly to the base, conspicuously glandular. Flowers about 2 cm. in diameter on long slender pedicels, in broad lax thin-branched 5–7-flowered compound corymbs; bracts and bractlets small linear-obovate, acuminate, glandular-serrate, turning red before falling, caducous; calyx-tube broadly obconic, the lobes gradually narrowed from broad bases, elongated entire or sparingly glandular-serrate, tipped with minute red glands, reflexed after anthesis; stamens 20; anthers pale yellow; styles 3 or 4, rarely 5. Fruit in few-fruited erect or drooping clusters, pyriform or when fully ripe sometimes oblong, pruinose, green or green tinged with red until late in the autumn, becoming dull crimson at maturity, about 1 cm. long, 1.8–1.9 cm. wide; calyx enlarged, with a short tube, a broad deep cavity, and reflexed appressed lobes, often deciduous from the ripe fruit; flesh thin, dry and mealy, greenish yellow; nuttles usually 3 or 4, thick, full and rounded at the ends, prominently ridged on the broad rounded back, with a high rounded ridge, 6–7 mm. long.



A slender arborescent shrub 2–3 m. in height with stems covered with pale gray scaly bark and 7–8 cm. in diameter, small erect and spreading branches, and stout nearly straight branchlets marked by small oblong orange-colored lenticels, olive green tinged with red when they first appear, becoming bright chestnut-brown and lustrous during their first season and dark reddish brown the following year, and armed with stout nearly straight dark purple ultimately gray spines 4–5 cm. long. Flowers at the end of May and early in June. Fruit ripens from the 1st to the 10th of October and usually falls during that month.

MASSACHUSETTS: Hill west of the main street of Great Barrington, and roadside between Great Barrington and Alford, *Brainerd* and *Sargent*, May 31, 1902; Great Barrington, *C. S. Sargent*, September 9 and October 4, 1902; CONNECTICUT: Gravelly soil, Poquonnock Plain, Groton, *C. B. Graves*, June, July and October 1901.

***Crataegus littoralis***, n. sp. Glabrous. Leaves ovate, acute, broadly cuneate or rounded or occasionally narrowed at the entire base, finely often doubly serrate above, with straight teeth terminating in bright red glands, and divided into 3 or 4 pairs of broad rounded or short pointed acute lobes; tinged with red when they unfold, and when the flowers open half-grown and light yellow-green; at maturity thin but firm in texture, dark green and lustrous on the upper surface, pale on the lower surface, 4–6 cm. long, 3–5 cm. wide, with prominent midribs impressed above and 4 or 5 pairs of thin primary veins arching to the points of the lobes; petioles slender, slightly wing-margined toward the apex, conspicuously glandular, often red in the autumn like the under side of the midribs, 2–2.5 cm. long; stipules linear to falcate, acuminate, glandular-serrate, reddish, caducous. Flowers 2 to 2.2 cm. in diameter on slender pedicels in compact 5 to 6-flowered simple corymbs; bracts and bractlets linear, acuminate, glandular-serrate, caducous; calyx narrowly obconic, the lobes gradually narrowed from broad bases, slender, acuminate, entire or sparingly glandular; petals often streaked with purple; stamens 20; anthers large, pale yellow; styles 2–4, usually 3. Fruit short-obovate, erect on the much thickened rigid pedicels, gradually narrowed toward the base, dark crimson, somewhat pruinose, 1–1.2 cm. long, 1–1.1 cm. wide; calyx prominent with a short distinct tube, a broad shallow cavity and spreading lobes usually deciduous from the ripe fruit; flesh thin, hard, greenish or yellowish white, slightly acid; nutlets 2–4, full and rounded at the ends, prominently ridged on the back, with a high round more or less grooved ridge, 6–7 mm. long.

A shrub with a broad open head 1–3 m. in height, with stems



rarely 1 dm. in diameter covered with pale gray smooth or near the ground slightly scaly bark, and slender nearly straight branchlets, green tinged with red when they first appear, becoming light red-brown and marked by oblong pale lenticels during their first season and ashy gray the following year, and sparingly armed with straight stout dark purple ultimately ashy gray spines from 2.5–3 cm. long.

Flowers about June 1st. Fruit ripens early in October and remains for at least another month on the branches.

CONNECTICUT: Rocky banks and elevations bordering salt marshes near Alwive Cove, New London, and Waterford, *C. B. Graves*, June, September and October 1902; *C. S. Sargent*, August 1892.

\* \* Stamens 10; anthers purple.

**Crataegus dissona**, n. sp. Glabrous. Leaves ovate to rhombic, acute or acuminate, cuneate and entire below, sharply and doubly serrate above, with straight spreading glandular teeth, and slightly and irregularly divided into acute lateral lobes; tinged with red as they unfold, and nearly fully grown when the flowers open, and then membranaceous and pale yellow-green, at maturity thin but firm in texture, dull dark blue-green on the upper surface, pale on the lower surface, 5–6 cm. long, 4–5 cm. wide, with thin light yellow midribs impressed on the upper side, and few slender primary veins arching obliquely to the points of the lobes; petioles slender, grooved, slightly wing margined toward the apex, sparingly glandular, with minute dark mostly deciduous glands, 2–2.5 cm. long; stipules linear, acuminate, glandular-serrate, caducous; leaves on vigorous shoots ovate, generally rounded or truncate at the broad base, more deeply lobed than the leaves of lateral branchlets, 5–6 cm. long and broad. Flowers 1.2–1.4 cm. in diameter on slender pedicels, in compact 5–7-flowered compound corymbs; bracts and bractlets linear, glandular-serrate, pink, caducous; calyx-tube broadly obconic, the lobes short, acuminate, entire or slightly glandular-serrate above the middle; stamens 10, or rarely 7–9; anthers pale purple; styles 3 or 4, rarely 5, surrounded at the base by a narrow ring of pale tomentum. Fruit pendant in drooping few-fruited clusters, pruinose, crimson, blotched with green and marked by few large dark dots, 1.2–1.6 cm. in diameter, sometimes 4 mm. broader than high; calyx small, sessile with a narrow shallow tube and erect boat-shaped lobes, their thin acuminate tips mostly deciduous before maturity; flesh thick, dry and mealy, bright yellow-green sometimes tinged with red; nutlets usually 3 or 4, thick, acute at the ends, prominently ridged on the back, with a high rounded ridge, about 7 mm. long.

A slender shrub 2–3 m. in height with stems 5 or 6 cm. in diame-



ter covered with pale gray scaly bark, erect and spreading branches and slender straight or slightly zigzag branchlets, yellow green somewhat tinged with red when they first appear, reddish brown or purple and marked by small pale dots during their first season, becoming grayish brown the following year and ashy gray during their third season, and armed with numerous stout nearly straight chestnut brown or purple ultimately gray spines 4–5 cm. long. Flowers during the last week of May. Fruit ripens and begins to fall the middle of October.

MASSACHUSETTS: Rocky upland pastures, Great Barrington, *Brainerd* and *Sargent*, May 1902, *C. S. Sargent*, September and October 1902. CONNECTICUT: Oxford *E. B. Harger*, May and September 1901; East Lyme, *C. B. Graves*, May and September 1902.

***Crataegus Jesupi***, n. sp. Glabrous. Leaves oblong-ovate, acuminate, broadly cuneate, rounded or rarely truncate at the mostly entire base, doubly serrate above with incurved glandular teeth and usually divided into 4 or 5 pairs of acute lateral lobes, membranaceous, pale yellow-green on the upper surface, paler on the lower surface, 6–7 cm. long, 4–5 cm. wide with slender yellow midribs impressed on the upper side and thin primary veins extending obliquely to the points of the lobes; petioles slender, slightly or on vigorous shoots broadly wing-margined toward the apex, glandular, with small scattered glands, 2–3.5 cm. long; stipules linear to falcate, acuminate, glandular-serrate, caducous. Flowers about 1.7 cm. in diameter on slender elongated pedicels, in broad, usually 7–9-flowered compound corymbs; bracts and bractlets oblong-obovate and rounded or acute at apex, to lanceolate, glandular-serrate, caducous; calyx-tube broadly obconic, the lobes gradually narrowed from broad bases, acute, entire, tipped with bright red glands; stamens 10; anthers dark red; styles 3 or 4, surrounded at the base by a narrow ring of pale tomentum. Fruit obovate to short-oblong, obtusely angled particularly below the middle, bright scarlet, pruinose when fully grown, destitute of bloom at maturity, marked by large dark dots, about 1 cm. long and wide; calyx small with a short tube, a narrow shallow cavity and spreading lobes mostly deciduous before the fruit ripens; flesh thin, dry, pale yellow; nutlets 3 or 4, thick, full and rounded at the ends, prominently and irregularly ridged on the back, with a high rounded ridge; 6–7 cm. long.

A treelike shrub 3–6 m. in height with stems 6–8 cm. in diameter and slender slightly zigzag branchlets marked by small lenticels, olive-green tinged with red when they first appear, reddish brown and lustrous during their first season, becoming gray slightly tinged



with red the following year, and armed with stout straight chestnut-brown ultimately gray spines from 2-4 cm. long. Flowers during the last week of May. Fruit ripens about the middle of October.

VERMONT: Moist ground; lower slopes of Twin Mountain, West Rutland, *W. W. Eggleston*, June and October 1900, May and October 1901.

At the suggestion of its discoverer this species is named for Henry G. Jesup, professor at Dartmouth and a critical student of the flora of northern New England.

§ INTRICATAE.

\* Anthers yellow.

CRATAEGUS MODESTA, Sargent, RHODORA, iii. 28, (1901).

Described from plants growing in a small isolated colony on the rocky ledges of Twin Mountain, West Rutland, Vermont, *Crataegus modesta* is now known to be widely distributed in western New England and to grow near Albany, New York. Southward it grows more vigorously than in the original station, with larger leaves and usually larger fruit.

NEW YORK: Rocky hillsides, North Albany, *Charles H. Peck*, May, June, September and October 1901; May and September 1902, *C. S. Sargent*, September 1902. MASSACHUSETTS: Hillside, Great Barrington, *Brainerd* and *Sargent*, May 1902; *C. S. Sargent*, September and October 1902. CONNECTICUT: Southington, *C. H. Bissell*, June and September 1901; *L. Andrews*, June and September 1902; Stonington, *C. B. Graves*, September, 1901, May 1902. Specimens in fruit only collected at East Windsor by *C. H. Bissell* (No. 22), at Oxford by *E. B. Harger* (No. 55), at Norwalk, by *C. H. Bissell* (No. 27), at Trumbull by *E. H. Eames* (Nos. 199 & 229), are provisionally referred to this species.

\* \* Anthers rose color or purple.

**Crataegus Stonei**, n. sp. Leaves oblong, narrowed to the ends, acuminate, cuneate, entire and often glandular at the base, sharply and doubly serrate above, with straight teeth tipped with dark red glands, irregularly divided into numerous short acute lateral lobes; when they unfold pale yellow green more or less tinged with red, covered above with short pale hairs and villose below along the midribs and veins; more than half-grown when the flowers open and



then membranaceous, at maturity thin but firm in texture, dark yellow-green and scabrate on the upper surface, pale on the lower surface, 7–8 cm. long, 4–5 cm. wide, with orange-colored villose midribs and veins, the thin veins extending obliquely to the points of the lobes; petioles slender, wing-margined toward the apex, slightly grooved, glandular, with stipitate dark glands, villose, 2–3 cm. long; stipules linear, acuminate, glandular-serrate, caducous. Flowers 2 cm. in diameter on stout pedicels, in villose 4–6-flowered simple compact corymbs; bracts and bractlets oblong-obovate, conspicuously glandular-serrate, turning red before falling, large and conspicuous; calyx-tube broadly obconic, coated with long matted pale hairs, the lobes gradually narrowed from broad bases, acuminate, coarsely glandular-serrate above the middle, villose, reflexed after anthesis; stamens 10; anthers large, rose color; styles 3 or 4, surrounded at the base by a broad ring of pale hairs. Fruit erect on elongated rigid slightly villose pedicels thickened toward the apex, obovate, light yellow or greenish yellow, covered toward the gradually narrowed or rounded base with long scattered pale hairs, 1.4 to 1.6 cm. long, 1.2–1.4 cm. wide; calyx large and prominent, with a broad shallow cavity and spreading much enlarged coarsely serrate lobes, dark red on the upper side at the base; flesh thin, dry and mealy; nutlets 3 or 4, thick, obtuse at the rounded ends, prominently ridge, with a high rounded ridge, 9–10 mm. long.

A shrub 1–2 m. in height with numerous intricately branched stems and stout slightly zigzag branchlets marked by occasional small oblong pale lenticels, green tinged with red and glabrous or villose when they first appear, and dark reddish purple and sometimes puberulous during their first season, becoming dull reddish brown the following year and armed with many stout nearly straight red-brown ultimately gray spines 4–6 cm. long and usually pointed toward the base of the branch. Flowers during the first week of June. Fruit ripen about the middle of September.

MASSACHUSETTS: Top of Smith Hill; Pelham, *G. E. Stone*, June and September and 1902.

I am glad to associate with this handsome and distinct species the name of its discoverer, Professor George E. Stone of the Massachusetts Agricultural College.

***Crataegus Peckii***, n. sp. — Leaves oblong-ovate, acute or acuminate, rounded to broadly concave-cuneate at the mostly entire glandular base, doubly serrate above, with straight or incurved gland-tipped teeth, slightly divided into 3 or 4 pairs of broad rounded or acute lobes; coated as they unfold with long matted pale hairs, and nearly fully grown and villose along the midribs and veins below when the flowers open, at maturity thin but firm in texture, dark green and



scabrate on the upper surface, paler on the lower surface, 7-8 cm. long, 5-6 cm. wide, with yellow glabrous or slightly villose midribs and remote primary veins arching to the points of the lobes; petioles stcut, slightly wing-margined above by the decurrent base of the leaf-blades, glandular with large dark glands, at first villose, glabrous and more or less deeply tinged with red in the autumn, 1.8-2.5 cm. long; stipules linear, coarsely glandular-serrate, mostly deciduous before the flowers open; on vigorous shoots leaves usually broader than long, rounded or cordate at the base, more deeply lobed than the leaves of fertile branchlets, 6.5-6 cm. wide, usually about 6 cm. long, the lower side of the stout midribs often bright red. Flowers 1.5-1.7 cm. in diameter, in 3-6-flowered simple or compound slightly villose corymbs; bracts and bractlets oblong-obovate and acute to linear and acuminate, coarsely glandular-serrate, caducous; calyx-tube broad, abruptly narrowed below into the short villose pedicel, the wide lobes entire below the middle, foliaceous, laciniately divided and glandular above the middle, acuminate at the apex; stamens 10; anthers large, pink or pale purple; styles 3 or 4. Fruit in few-fruited erect clusters on short slight villose pedicels, subglobose to short-oblong or ovate, full and round and slightly hairy at the ends, light yellow-green more or less tinged with red, lustrous, marked by few large dark dots, 1.8-3 cm. long; calyx enlarged, with a short tube, a broad deep cavity, and spreading or rarely erect lobes coarsely serrate toward the apex; flesh thick, green, dry and mealy; nutlets 3 or 4, obtuse at the ends, prominently ridged on the broad rounded back, 1.6-1.8 cm. long.

A broad shrub 1-2 m. tall, with numerous intricately branched stems covered with dark gray bark and stout nearly straight branchlet marked by many large oblong pale lenticels, orange-brown and more or less villose when they first appear, light red-brown and usually villose during their first season, becoming dark gray-brown the following year, and sparingly armed with slender slightly curved chestnut brown ultimately gray spines 3.5-6 cm. long. Flowers during the first week of June. Fruit ripens from the first to the middle of October.

NEW YORK: On a slate stone knoll a few miles north of Troy, on the Hudson River, in Lansingburg, *C. H. Peck*, June, September and October 1901 and 1902. To this species I have referred provisionally fruiting specimens of a shrub collected by me on a hill west of the main street of Great Barrington, October 4, 1902.

Professor Charles H. Peck, the distinguished state botanist of New York, who has recently discovered in the neighborhood of Albany several other undescribed forms in this genus, permits me to associate his name with this handsome species.



***Crataegus Bissellii***, n. sp. Glabrous. Leaves oval and gradually narrowed to the ends, or rarely ovate and broadly cuneate or rounded at the base, acute or acuminate at the apex, coarsely and often doubly glandular-serrate except toward the glandular base, thin but firm in texture, dark dull blue-green on the upper surface, pale yellow-green on the lower surface, 4–6 cm. long, 2.5–4 cm. wide, with thin orange-colored midribs and usually four pairs of slender primary veins; petioles slender, slightly wing-margined toward the apex, glandular, with small dark glands, 2–3 cm. long; stipules linear, acuminate, coarsely glandular-serrate, caducous; on leading shoots sometimes broadly ovate, acute, full and rounded or very rarely subcordate at the base, often slightly 3-lobed, with small acute lateral lobes, 5–6 cm. long and broad, with stout petioles broadly wing-margined above the middle and foliaceous lunate coarsely glandular-serrate stipules often 1 cm. in length. Flowers about 1.5 cm. in diameter on slender elongated pedicels in 4–7-flowered compound corymbs; bracts and bractlets linear to oblong, acuminate, coarsely glandular-serrate, reddish, large and conspicuous, caducous; calyx-tube broadly obconic, the lobes gradually narrowed from broad bases, coarsely but irregularly glandular-serrate; stamens 10; anthers small, pink to rose-purple; styles 3 or 4. Fruit in drooping clusters, pyriform, gradually narrowed below into the slender pedicel, dull orange-red more or less tinged with green, 1.2–1.4 cm. long, 9–10 mm. wide; calyx large and prominent, with a short tube, a broad deep cavity, and reflexed lobes usually serrate only toward the apex, and bright red on the upper side below the middle; flesh thin, yellow-green, dry and mealy; nutlets 3 or 4, thick, rounded at the obtuse ends, prominently ridged on the back, with a broad rounded ridge, 7–8 mm. long.

A shrub usually about 1, very rarely 2, m. in height with numerous stems covered with pale gray bark, spreading branches, and thin nearly straight branchlets marked by occasional small pale lenticels, bright chestnut-brown and lustrous during their first season, becoming pale reddish brown the following year, and unarmed or armed with slender nearly straight purple lustrous ultimately ashy gray spines mostly pointed toward the base of the branch, 2.5–4 cm. long. Flowers at the end of May or during the first week of June. Fruit ripens from the 20th of September to the 10th of October and falls as soon as it is ripe.

CONNECTICUT: Open pastures in rich moist soil, or borders of thickets in dry and hard or sandy soil, and on low hills of trap rock in and near Southington, *C. H. Bissell*, September 1900, June and October 1901; *L. Andrews*, May, June and September 1902; *C. S. Sargent*, September 1902.



**Crataegus Harger**i, n. sp. Glabrous. Leaves ovate to ovate-oblong, acute or acuminate, full and rounded or broadly cuneate, or gradually narrowed at the mostly entire base, sharply and often doubly serrate, with spreading glandular teeth, thin but rigid in texture, light yellow-green on the upper, pale on the lower surface, about 3 cm. long, 2–2.3 cm. wide, with slender yellow midribs and primary veins deeply impressed on the upper side; petioles slender, slightly wing-margined at the apex, glandular with numerous dark persistent glands, 1.3–1.5 mm. long; on leading shoots leaves ovate, rounded or short-pointed at the apex, truncate to subcordate at the base, deeply 3-lobed, with small rounded or short-pointed lateral lobes, often 4.5–5 cm. long and wide, with stout petioles wing-margined almost to the base and foliaceous lunate coarsely glandular-serrate stipules. Flowers about 1.2 cm. in diameter on slender elongated pedicels in 3–5-flowered compound corymbs; bracts and bractlets linear to oblong-obovate, acute or acuminate, coarsely glandular-serrate, reddish before falling, caducous; stamens 10; anthers large, rose color; styles 3; calyx-tube narrowly obconic, the lobes gradually narrowed from broad bases, acuminate, entire or irregularly glandular-serrate, reflexed after anthesis. Fruit on slender erect pedicels 1.5–2 cm. in length and gradually enlarged at the apex, obovate, full and rounded above, abruptly narrowed below, dull orange-green, 1–1.2 mm. in length, calyx large and prominent with a long tube, a deep broad cavity and reflexed lobes; flesh thin, green dry and mealy; nutlets 3, thick, full and rounded at the ends, prominently ridged on the back, with a broad rounded often grooved ridge, about 6 mm. long.

A straggling semiprostrate shrub usually not exceeding 1 m. or very rarely 2 m. in height, with stems 2–3 cm. in diameter and covered with ashy gray bark, and slender slightly zigzag branchlets dark olive green tinged with red when they first appear, dull red-brown and marked by few large pale lenticels during their first season, becoming light reddish brown the following year, and armed with many straight very slender light red-brown lustrous spines 3–5 cm. long spreading in all directions and long persistent on the old stems, and nearly globose winter-buds 3–4 mm. in diameter and covered with orange-red lustrous scales rounded and scarious on the margins. Flowers at the end of May. Fruit ripens toward the end of September without becoming soft and remains on the branches after the leaves have fallen.

CONNECTICUT: Rocky pastures, Oxford, *E. B. Harger*, May, June and September 1901, May and September 1902; *C. S. Sargent*, September 1902; Southington, *C. H. Bissell*, September 1901; *L. Andrews*, May and September 1902.

ARNOLD ARBORETUM.